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ABSTRACT

An innovative drug education course was taught to seventh and eighth graders and evaluated in a true experiment. Students learned Lasswell's framework for understanding human needs and motives, a systematic decision-making procedure, and information about the pharmacological, psychological, and social consequences of licit and illicit drug use. The course focused primarily upon "soft" drug use. Process evaluation consisted of documentation of classroom activities by an outside observer, interviews with experimental and control students and teachers; and questionnaire surveys of experimental students. Overall, students gave mediocre ratings of the course with respect to interest, usefulness, and clarity; classroom teachers were critical of the outside instructor's teaching style and the course content. Outcome evaluation involved testing: drug knowledge, general attitudes toward drug use, perceived benefits and costs of various types of substance use, perceived peer attitudes toward, and use of, various substances, and intentions to use, current use, and lifetime use of various substances. Analyses showed that the course produced a pattern of predicted effects for grade 7 females, but not for grade 7 males or grade 8 males or females. For grade 7 females, the course increased drug knowledge, decreased perceptions of favorable peer attitudes toward soft drug use, and decreased personal involvement in use of both alcohol and marijuana. (Author/GK)

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An Evaluation of an Innovative Drug Education Program: First Year Results

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Abstract

An innovative drug education course was taught to seventh and eighth graders and evaluated in a true experiment. The course was taught by an outside instructor and consisted of ten class sessions conducted once per week in social studies classes. In the course, students learned a) Lasswell's framework for understanding human needs and motives, b) a systematic decision-making procedure, and c) information about the pharmacological, psychological, and social consequences of licit and illicit drug use. The course focused primarily upon "soft" drug use--tobacco, alcohol, and marijuana.

Process evaluation was conducted, consisting of a) documentation of classroom activities by an outside observer, b) interviews with samples of experimental and control students and teachers, and c) three questionnaire surveys of experimental students during the fourth, seventh, and tenth weeks of the course. Process data showed that the course was often too technical and fast-paced for the students, and that it was only partially successful at involving the broad range of students in class discussions and activities. Overall, students gave the course mediocre ratings with respect to interest, enjoyableness, usefulness, and clarity, and classroom teachers were critical of the instructor's teaching style and the course content. Interviews with control classes showed no diffusion of the treatment from experimental to control students.

The research design for the outcome evaluation involved random assignment from nine matched pairs of social studies classes to experimental and control conditions. Each group consisted of approximately 250 students. Both pre- and posttest questionnaires were administered. Testing covered a) drug knowledge, b) general attitudes toward drug use, c) perceived benefits and costs of various types of substance use, d) perceived peer attitudes toward, and use of, various substances, e) intentions to use, current use, and lifetime use of various substances. Scaling analysis showed that all scales except Drug Knowledge had good or excellent internal consistency reliabilities.

Initial equivalence analysis showed experimental and control students to be comparable. Class-level univariate analyses of variance and covariance were performed on the student outcome data. These analyses showed that the course produced a pattern of predicted effects for grade 7 females, but not for grade 7 males or grade 8 males or females. For grade 7 females, the course increased drug knowledge, decreased perceptions of favorable peer attitudes toward soft drug use, and decreased personal involvement in use of both alcohol and marijuana. Few significant effects were obtained for any of the other three subgroups.

The failure of this course to produce more of the predicted outcomes is perhaps best explained as an implementation failure in light of the process evaluation findings. A partial replication of this study will be conducted in which a better designed and more effectively delivered course is provided to seventh graders.

INTRODUCTION

As here defined, "drug education" courses are those which attempt to influence students' drug use behaviors by teaching facts about drugs. To date, such programs have not fared well under the scrutiny of comparative evaluation (see reviews by Blum, 1976; Goodstadt, 1973, 1979; Schaps, DiBartolo, Moskowitz, Palley, & Churgin, 1981). Most studies have shown drug education to produce negligible or mixed results, and several (e.g., Stuart, 1974) have documented counterproductive effects.

The course evaluated in the present study attempted to improve upon previous drug education efforts by emphasizing the decision-making process rather than information about drugs. Information was provided in the course, mostly in response to questions submitted by students, but the bulk of class time was devoted to a) teaching Lasswell's (1966) framework for understanding motives and needs, b) teaching a systematic decision-making process, c) examining the personal and social consequences of drug use decisions, and d) identifying alternatives to drug use in various choice situations. In these respects, the course was consistent with recent suggestions for improving drug education:

> Let us help children recognize the reasons for their behavior, and then by understanding themselves, equip them to better cope with their problems. Let us provide them with alternatives to their existing behavior patterns, help them to identify their strengths and successes, and then hope that the attitudinal changes they have experienced as a result of program participation translate into prolonged behavioral changes. (Wepner, 1979, p. 99).

As Wepner suggests, it may be unrealistic to expect behavioral changes from a single drug education course over a short time span.[1] Immediate effects on behavior may be especially unrealistic at the ages of interest here, where many types of drug use are just beginning to spread, and the opportunities to show preventive effects may be limited to the "soft" drugs--tobacco, alcohol, and marijuana--if such opportunities are present at all. Consequently, although drug-related intentions and behaviors were carefully assessed in this study, much attention was also given to measuring such intermediate outcomes as drug knowledge, attitudes toward drug use, perceptions of benefits and costs of drug use, perceived peer attitudes toward drugs, and perceived patterns of peer drug use.

This study took place at a junior high school in a predominantly white, middle-class, suburban community of approximately 50,000 population in Northern California. The study was conducted during the 1978-79 school year as part of a larger effort to evaluate several primary prevention strategies.

The ten-session drug education course was taught directly to students by an outside instructor. It was designed to accomplish four basic objectives:

- To increase students' understanding of basic human needs;
- To develop students' skills at systematic decision-making;
- To teach alternative methods for handling life problems and consequent stress; and
- To provide information regarding the emotional, social, and physical consequences of substance use.

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[1]In the present study, a follow-up post-test of experimental and control groups will be conducted one year after the first post-test.

Each of these objectives was thought to play a potentially important role in developing students' abilities to make constructive decisions about substance use. By attaining the objectives, the course was intended to influence students' drug knowledge, perceived costs and benefits of use, general attitudes regarding use, and, perhaps, actual involvement in use.

Each class session of the course lasted 45 minutes. Sessions were conducted during regular class time, in social studies classrooms. Regular classroom teachers remained in their rooms during the sessions, but did not take part except to maintain discipline.

In the first three sessions, students reviewed Lasswell's (1966) eight universal human needs, and compiled group lists of stress-producing situations commonly encountered by young people. In the next three sessions, students analyzed stressful situations and the consequences of various choices in those situations. They also received information on marijuana, alcohol, and tobacco and other stimulants, in response to questions which they submitted anonymously to the instructor. In the last four sessions, students practiced applying a systematic decision-making process to various problem situations, some involving drug use choices.

In addition to the student course, a four-session evening course was offered to interested parents. The parent course was in part an accelerated version of the student course, and in part a course on dealing with children's questions regarding drugs. The parent sessions were attended by only 5-15 individuals, and thus the course is not considered a significant aspect of the treatment.

Among a number of student outcomes assessed in the present study, the course was predicted to affect students' a) knowledge of factual material covered in the course, b) attitudes toward use of the "soft" or "gateway" drugs (i.e., tobacco, alcohol, and marijuana), c) perceptions of their peers' attitudes toward, and use of, soft drugs, d) perceived costs and benefits (i.e., negative and positive consequences) of soft drug use. The course was considered somewhat less likely to affect personal involvement in soft drug use, because of the brief interval between the completion of the course and the administration of the posttest, and because behavioral change was considered more difficult to achieve than attitudinal change. Finally, the course was considered least likely to affect students' attitudes toward, or use of, "hard" drugs, because at these grade levels, students' orientations towards these drugs typically are overwhelmingly negative already.

Process Evaluation Methods and Results

Several methods were used to document the delivery of the drug education course, and to monitor reactions to the course. These methods included a) detailed descriptions of course sessions compiled by an observer in the classroom, b) records of student attendance at course sessions, c) three questionnaire surveys of experimental students during the course, d) individual interviews with small samples of students and regular classroom teachers at two points during the course, and e) group interviews with students in control classes. These methods and the process evaluation data gathered with them are briefly described below.

DESCRIPTIONS OF COURSE SESSIONS

To document service delivery, an observer attended all course sessions in one seventh grade and one eighth grade class, and made detailed notes about both the instructor's and the students' activities. These records described a) the instructor's presentations, b) the instructor's and students' verbal and nonverbal interactions, and c) any materials used or distributed.

The observer sat in the back of the classroom and avoided interactions with students. The instructor explained that the observer was present to "take notes so that we can prepare a manual for the course."

The observer's descriptions showed that the course was generally conducted according to plan, but that it generated very little thoughtful discussion of issues and problems. The student's responses and comments, though frequent, tended to be brief, superficial, and almost always in response to the instructor's direct questions. Also, the pace of class activities was often too rapid to allow for discussion, and there was much reliance on paper-and-pencil exercises

STUDENT ATTENDANCE RECORDS

Student attendance at all course sessions was recorded. Aggregated attendance figures are presented in Table 1, and show that 92% of the students attended at least eight of the ten course sessions.

TABLE 1

STUDENT ATTENDANCE AT COURSE SESSIONS

NUMBER OF ABSENCES FROM COURSE SESSIONS	NUMBER OF STUDENTS	PERCENT OF ALL STUDENTS
0	138	60.3%
1	51	22.3
2	22	9.6
3	11	4.8
4	2	.9
5	3	1.3
6	1	.4
7	1	.4
Totals	229	100.0%

STUDENT FEEDBACK SURVEYS

Students in the course were surveyed by anonymous questionnaire at the third, seventh, and tenth sessions. Participation in these surveys was voluntary; 193 students completed the first questionnaire, 181 completed the second, and 195 completed the third. Thus, in each wave, approximately four-fifths of students returned usable questionnaires. The rate of return for seventh graders did not differ significantly from that for eighth graders.

In all three questionnaires, students were asked to rate recent course sessions for interest, usefulness, clarity, and enjoyableness. These ratings, shown in Table 2, ranged from one to four, with higher scores signifying more positive ratings. In the absence of comparative data (i.e., similar ratings for other courses), and given that the midpoint on the ratings scales was 2.5, the mean ratings in Table 2 are probably best regarded as neutral or mediocre. Standard deviations for the ratings were relatively sizeable, clustering between .8 and 1.1, and indicated substantial diversity of opinion about the course.

In Table 2, the only statistically significant ($p < .01$) difference between seventh and eighth graders is that for the clarity ratings in the third wave. Eighth graders reported being less lost or confused than seventh graders during the last three class sessions. In general, though, seventh and eighth graders rated the course similarly.

TABLE 2

MEAN STUDENT RATINGS[1] OF COURSE INTEREST, USEFULNESS, CLARITY, AND ENJOYABLENESS

Student Grade Level	Survey Wave / Ns	How Interesting or Boring?			How Much Have You Learned?			How Often Were You Confused or Lost?			How Much Have You Liked The Class Meetings?		
		1	2	3	1	2	3	1	2	3	1	2	3
Seventh	80-92	2.5	2.6	2.4	2.6	2.8	2.5	2.9	2.8	2.5	2.8	2.9	2.5
Eighth	95-107	2.3	2.5	2.4	2.4	2.6	2.5	3.1	2.9	3.0	2.8	2.7	2.7
All Students	177-190	2.4	2.5	2.4	2.5	2.7	2.5	3.0	2.8	2.7	2.8	2.8	2.6

[1]Ratings ranged from 1 to 4, with higher numbers signifying more positive responses.

The final feedback questionnaire also contained eight items asking students to assess the entire course and the instructor, using four-point rating scales ranging from "strongly agree" to "strongly disagree." These ratings, shown in Table 3, also clustered about the mid-point, with standard deviations ranging from .7 to 1.1. The ratings of seventh and eighth graders differed significantly ($p < .01$) on two of these items. Eighth graders rated the clarity of the instructor's explanations more highly than did seventh graders, however, eighth graders thought the facts taught in the course were less useful in making decisions about using drugs.

STUDENT AND TEACHER INTERVIEWS

Individual interviews were conducted midway through the course with 12 randomly selected students in one seventh and one eighth grade class, and with 11 of the original 12 at the end of the course. The seven teachers in whose classes the course was held were also interviewed individually. All interviews were conducted by a researcher, using a semi-structured, open-ended format. Student interviews took 5-10 minutes; teacher interviews lasted 10-30 minutes.

Interviewed students generally seemed to like the course, a finding at odds with the mediocre course ratings reported in the previous section. This discrepancy may be due to poor sampling (although the students were sampled randomly, the classes were not), or to the different demand characteristics of the one-to-one interview situation. In any case, the interviewed seventh graders offered few criticisms of the course. Several eighth graders

TABLE 3

FINAL STUDENT RATINGS OF THE COURSE AND INSTRUCTOR

Questionnaire Item	Mean Ratings[1]		
	Seventh Graders (N=81-85)	Eighth Graders (N=101-105)	All Students (N=182-190)
After taking this course I understand the problems of drug abuse better.	2.7	2.9	2.8
The instructor explains things clearly.	2.3	3.0	2.7
Most students my age already have the information they need about drugs.	2.3	2.2	2.3
This course should be taught to this grade again next year.	2.5	2.8	2.6
The instructor repeats the things he says too much.	2.4	2.4	2.4
This course answered the questions I had about drugs.	2.3	2.5	2.4
I trust what the instructor told us about drugs.	2.8	2.9	2.9
The facts in this course are of little use in making up my mind about using drugs.	2.8	2.4	2.6

[1]Ratings were made using a four-point scale consisting of the following responses: 1-strongly agree, 2-agree, 3-disagree, 4-strongly disagree. In this table, means are adjusted so that higher numbers signify more positive responses to the course.

thought the course too repetitious. Several thought the instructor avoided answering students' questions about drugs. Both seventh and eighth graders desired more drug information and less practice in using the decision-making process. In essence, students were asking for a more traditional type of drug education.

Teachers generally were critical of the course, although one thought it was well designed and implemented, and could offer no criticisms or suggestions. Four teachers thought the course was poorly implemented, and that the instructor had failed to engage the students effectively or communicate what he knew. These teachers criticized the curriculum as too abstract, difficult, and dense. Two of the four said that their students complained about the instructor's superficial questions and rapid pace. These teachers pointed to a simplified curriculum and an instructor more experienced in teaching at the junior high level as the keys to making the course attractive to a broader range of students.

The two remaining teachers also thought the course content was "over the heads" of their students and that the instructor had relied too heavily on lectures. They felt that more discussion or "give and take" was necessary to involve students in course content.

INTERVIEWS WITH CONTROL STUDENTS

After posttesting, a researcher conducted a group interview with one seventh grade and one eighth grade control class. The majority of the 52 students in both classes had heard about the drug education course, mostly from friends. About half had heard that the course was "kind of boring" or "a waste of time." Few had heard anything specific about the course. One student had heard that "the teacher talked about drugs." A second had heard that "stupid questions were asked." A third had heard that the teacher "wouldn't take the time to answer students' questions."

None of the students could describe the course's content or procedures, suggesting that although the course was known by reputation to many control students, there had been no diffusion of skills or substantive knowledge.

Outcome Methods

Assignment of Classes to Condition

Eighteen social studies classes were paired on the basis of grade level (seven or eight), ability group level (low or heterogeneous), and pretest data on current drug use (percentages of students reporting any current use of alcohol, tobacco, and marijuana).[3] One class in each pair was then randomly assigned to receive the drug education course (experimental condition) during the second semester of the year, and the other class served as an untreated comparison group (control).

The subjects for the study were 500[4] students enrolled in the experimental (N = 244) and control classes (N = 256) at the beginning of the second semester. Eighty-eight percent of these students (N = 439) completed the posttest survey and 81% (N = 404) completed both the pretest and posttest. The extent of attrition was similar for both conditions. Four students from each condition were deleted from the analysis because they reported significant use of an unavailable drug ("serotonin" or "wagon wheels"). This drug was included on the questionnaire to identify students who exaggerated their drug use.

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[3]Five additional classes were dropped from the design because appropriate matches could not be made.

[4]Fifteen students were not included because their parents declined to allow them to participate in the research.

Survey Administration Procedures

The pretest Drug and Alcohol Survey questionnaire (DAS) was administered in October, 1978 and the posttest DAS in May, 1979 by four carefully trained substitute teachers. A make-up session was held for students who were absent for the original session.

An administration procedure was employed which identified students by their school district identification numbers. Questionnaires were pre-labeled with student names on the cover sheet and student identification numbers on page one. In a prepared statement, administrators assured students of complete confidentiality and explained the need for identification numbers as a way of tracking students over time. Students were instructed to tear off the cover pages that displayed their names to enhance the confidentiality induction.

Instrumentation

Different versions of the DAS were employed for the pretest and posttest containing somewhat different item wordings, response formats, and scales. The scales were derived from a theoretical causal model and empirical scaling analyses. Multiple group confirmatory factor analyses were applied to DAS inter-item correlation matrices. The analyses were conducted on separate pretest and posttest random samples composed of students from several junior high schools.[5] The resultant scales appear in Table 4 with their internal consistency reliabilities estimated by coefficient alpha. The reliabilities obtained were adequate for all

[5]The matrices were computed using pair-wise deletion of missing data and communalities were inserted into their diagonal elements.

TABLE 4

DRUG AND ALCOHOL SURVEY PRETEST AND POSTTEST SCALES AND INTERNAL CONSISTENCY RELIABILITIES (COEFFICIENT ALPHA)

SUBSCALE NAME	RELIABILITY	
	PRETEST[1]	POSTTEST[2]
General Drug Attitudes (General Att)	.92	.93
Perceived Benefits of Alcohol Use (Alc Benefits)	.85	.85
Perceived Benefits of Marijuana Use (Pot Benefits)	.89	.91
Perceived Costs of Alcohol Use (Alc Costs)	NA[3]	.84
Perceived Costs of Marijuana Use (Pot Costs)	NA	.90
Attitudes Toward Soft Drug Use (Soft Att)	.79	.76
Drug Knowledge (Knowledge)	NA	.40
Perceived Peer Attitudes Toward Soft Drugs (Soft Peer Att)	.87	.84
Perceived Peer Use of Soft Drugs (Soft Peer Use)	NA	.82
Involvement in Alcohol Use (Alc Involve)	.92	.88
Involvement in Cigarette Use (Cig Involve)	.92	.91
Involvement in Marijuana Use (Pot Involve)	.95	.95
Perceived Benefits of Pill Use (Pill Benefits)	.92	.91
Perceived Costs of Pill Use (Pill Costs)	NA	.89
Perceived Peer Attitudes Toward Hard Drugs (Hard Peer Att)	.96	.96
Perceived Peer Use of Hard Drugs (Hard Peer Use)	NA	.96
Attitudes Toward Hard Drug Use (Hard Att)	.93	.93
Involvement in Inhalant Use (Inh Involve)	.86	.70
Involvement in Barbiturate Use (Barb Involve)	.84	.89
Involvement in Amphetamine Use (Amp Involve)	.88	.90
Involvement in Cocaine Use (Coc Involve)	.75	.88
Involvement in PCP Use (PCP Involve)	.83	.86
Involvement in LSD Use (LSD Involve)	.70	.87
Involvement in Heroin Use (Heroin Involve)	.93	.77

[1]N = 473
[2]N = 586
[3]NA indicates that this scale was not administered.

scales except Drug Knowledge.[6] Pretest and posttest reliabilities for equivalent scales are highly consistent despite some differences in item wordings and response formats.

The General Drug Attitudes (General Att) scale consists of 17 statements that assess general attitudes toward licit and illicit substance use. Subjects responded to items on five-point scales ranging from "strongly agree" to "strongly disagree." Items were scored such that high scores indicate "pro-drug" orientations.

The perceived benefits of alcohol use (Alc Benefits), marijuana use (Pot Benefits), and "pill" use (Pill Benefits), and the perceived costs of using these same drugs (Alc Costs, Pot Costs, and Pill Costs) were each measured by separate scales. Each Benefits scale consisting of eight questions describing possible benefits of using the substance. Subjects responded on four-point scales ranging from "does not help at all" to "helps very much" to indicate whether they saw the drug as instrumental in achieving the proposed benefits. Each Costs scale consisted of five statements describing possible adverse consequences of using the substance. Subjects responded on four-point scales ranging from "strongly agree" to "strongly disagree" that use of the drug will produce the adverse effects.

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[6]Drug Knowledge items were selected from the Drug Education curriculum and are not representative of the domain of knowledge items. Furthermore, knowledge about drugs comes from a variety of sources and may be multidimensional, resulting in attenuated internal consistency.

The Perceived Peer Attitudes Toward Soft Drugs (Soft Peer Att) scale measured the attitudes that subjects perceived other students in their grade as having toward use of the "soft" or "gateway" substances: alcohol, cigarettes and marijuana. The corresponding hard drug scale--Perceived Peer Attitudes Toward Hard Drugs (Hard Peer Att)--assessed perceived peer attitudes toward the use of inhalants, barbiturates or tranquilizers, amphetamines or stimulants, cocaine, PCP, LSD or psychedelics, and heroin or morphine. Subjects responded to each substance on five-point scales ranging from "a very bad thing" to "a very good thing."

The Perceived Peer Use of Soft Drugs (Soft Peer Use) and Perceived Peer Use of Hard Drugs (Hard Peer Use) scales assessed subjects' perceptions of the prevalence of soft and hard drug use among students in their grade. Subjects indicated their prevalence estimate for each substance by using six-point scales ranging from "very few (0%)" to "about three-fourths or more (75% - 100%)" of peers.

The Attitude Toward Soft (Soft Att) and Hard (Hard Att) Drug Use scales assessed subjects' own attitudes toward use of the two sets of drugs. The response formats were identical to the Perceived Peer Attitudes scales.

Substance Involvement scales were computed for each of the ten drugs: alcohol (Alc Involve), cigarettes (Cig Involve), marijuana or hashish (Pot Involve), inhalants (Inh Involve), barbiturates or

tranquilizers (Barb Involve), amphetamines or stimulants (Amp Involve), cocaine (Coc Involve), PCP (PCP Involve), LSD or psychedelics (LSD Involve), and heroin or morphine (Her Involve). Each scale consisted of three items assessing current use,[7] lifetime use, and intentions to use.[8]

The Drug Knowledge (Knowledge) scale consisted of seven multiple-choice items measuring pharmacological knowledge. Each item had one correct response and several distractors. The Knowledge scale score is the number of correct responses.

Data Analysis

The experimental design involved random assignment of intact classes (and not students) to the experimental and control conditions. Least-squares analysis techniques assume the statistical independence of observations. Treating individual students' responses as independent when they share a common classroom environment (and common exposure to treatment) is problematic because the likelihood of spuriously obtaining a significant treatment effect is enhanced. Hence, the data were analyzed at the class level.

Classroom means were computed for pretest and posttest measures separately for each sex. This approach allows control for, and examination of the relationship between student sex and treatment effects. Separate analyses were then conducted for males and females at each grade level to avoid problems with heterogeneity of variance and covariance.

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[7]Operationalized on the pretest as "during the past three months" and on the posttest as "during the last four weeks."

[8]Operationalized on the pretest as "during the next two years" and on the posttest as "during the next year."

Univariate analyses of variance and covariance were the primary analysis strategies. While multivariate analysis controls better for Type I error, it has several problems. Multivariate analysis generally has less statistical power than univariate analysis when sample sizes are small. The effect of violations of the homogeneity of covariance assumption, which frequently occurs, is not well understood. In addition, the selection of covariates in the multivariate analysis of covariance is constrained by the parallelism assumption; i.e., that the regression hyperplanes be parallel.

Due to the small sample sizes ($\underline{n}$ = 4 or 5) in this study, statistical analyses are lacking in power. If we adopt a significance level of .05 and set power (the likelihood of detecting a real effect) at .80, with ANOVA we are capable of detecting a minimum effect size of 2.4 SD[9] for grade 7 and 2.0 SD for grade 8. By using ANCOVA we are able to increase power (or decrease minimum detectable effect size). With a pretest-posttest correlation of .55, (the median $\underline{r}$), the minimum detectable effect sizes are 1.7 SD and 1.4 SD, respectively. However, even these effect sizes are substantial. Power can be further increased by increasing Type I error. In the present study we have set Type I error for each analysis at .10. Since we conducted many analyses, isolated effects must be interpreted cautiously because they may be due to Type I error. Interpretation of results is based on patterns in the data rather than on single findings.

Rules were set for handling missing data in computing scale scores. A scale score was computed for a student if at least 60% of the items comprising

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[9]Effect size is expressed in the metric of the pooled within-group standard deviation.

that scale were present. Any missing item score was replaced by the mean for that item in the appropriate cell of the experimental design. This procedure utilized most of the item data and provided unbiased cell means. When more than 40% of the items comprising a scale were missing, the student received a missing value for that scale, and the case was not utilized in computing the class mean for that scale.

Outcome Results

Initial Equivalence

Analyses were conducted to assess the initial equivalence of experimental and control groups. The means and standard deviations for all pretest and posttest measures are summarized in Table 5 by grade, sex and treatment condition. For all variables except Knowledge a low score is desirable. The posttest results will be discussed later.

Analyses of variance were performed on the pretest measures with treatment condition as the factor. The only significant differences obtained were for grade 7 females. Experimentals responded initially higher than controls on Soft Peer Att, F (1,6) = 4.18, $p < .10$, and Hard Peer Att, F (1,6) = 4.15, $p < .10$. Thus, evidence for the initial equivalence of the experimental and control groups was substantial.

Analysis of Posttest Data

A one-way analysis of covariance was conducted on each posttest measure with the corresponding pretest employed as a covariate. For posttest measures that did not have a corresponding pretest measure, an alternative pretest measure was employed. Soft Att was used as the covariate for Alc Costs, Pot Costs, and Pill Costs, and Soft Peer Att was employed for Soft Peer Use. Analysis of variance was performed on Knowledge since no suitable covariate existed for this variable. ANOVA was also performed on Hard Peer Att, Hard Peer Use, Coc Involve, PCP Involve, LSD Involve, and Her Involve, because the pretest scores did not predict the corresponding posttest scores. No analysis was performed on seven involvement scales for grade 7 due to the extremely small variance in these measures.

TABLE 5

DESCRIPTIVE STATISTICS BY GRADE LEVEL BY SEX BY TREATMENT CONDITION

		GRADE 7								GRADE 8							
		MALE STUDENTS				FEMALE STUDENTS				MALE STUDENTS				FEMALE STUDENTS			
		Experimental		Control		Experimental		Control		Experimental		Control		Experimental		Control	
Scale	Test	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
General Att	Pre	2.12	.35	1.99	.36	1.96	.21	2.04	.32	2.62	.40	2.36	.42	2.25	.16	2.26	.36
	Post	2.26	.18	2.11	.33	2.17	.40	2.27	.35	2.80	.30	2.57	.54	2.40	.16	2.39	.38
Alc Benefits	Pre	1.62	.39	1.47	.12	1.59	.25	1.54	.16	1.94	.45	1.69	.30	1.77	.26	1.68	.31
	Post	1.79	.21	1.62	.30	1.75	.13	1.78	.29	2.04	.20	1.93	.39	1.89	.15	1.91	.28
Pot Benefits	Pre	1.59	.39	1.54	.17	1.58	.23	1.64	.24	2.15	.46	1.87	.34	2.02	.32	1.93	.36
	Post	1.73	.20	1.70	.51	1.71	.14	1.77	.19	2.13	.22	2.10	.44	2.09	.26	2.04	.43
Alc Costs	Post	2.09	.10	1.95	.27	2.04	.16	1.94	.22	2.23	.13	2.36	.33	1.99	.12	2.19	.22
Pot Costs	Post	1.88	.11	1.87	.45	1.84	.17	1.92	.25	2.34	.22	2.27	.43	2.19	.12	2.20	.34
Soft Att	Pre	1.92	.15	1.79	.37	1.96	.19	1.81	.28	2.44	.53	2.12	.43	2.19	.30	2.14	.28
	Post	2.09	.26	1.95	.40	2.01	.22	2.26	.33	2.67	.22	2.69	.58	2.42	.12	2.37	.34
Knowledge	Post	2.69	.48	2.09	.62	2.21	.47	1.47	.09	3.33	.36	2.16	.33	2.84	.53	2.49	.28
Soft Peer Att	Pre	2.14	.22	2.22	.38	2.61	.31	2.17	.30	2.93	.28	3.06	.27	3.14	.70	3.38	.37
	Post	2.35	.18	2.63	.47	2.76	.18	3.17	.24	3.09	.24	3.31	.42	3.55	.41	3.24	.14
Soft Peer Use	Post	23.59	8.08	25.67	10.32	27.78	6.73	38.86	6.13	44.80	4.01	43.99	5.31	47.29	5.35	48.46	7.28
Alc Involve	Pre	2.34	.46	2.46	.55	1.93	.24	2.04	.55	2.90	.54	2.84	.73	2.41	.62	2.92	.54
	Post	2.33	.18	2.43	.64	1.75	.27	2.31	.48	2.77	.28	2.75	.36	2.75	.32	2.54	.36
Cig Involve	Pre	1.83	.72	1.64	.50	1.61	.24	1.83	.47	2.31	.82	2.08	.43	1.99	.55	2.58	.79
	Post	1.58	.30	1.72	.46	1.64	.31	2.37	.52	2.24	.25	2.11	.52	2.23	.25	2.58	.66
Pot Involve	Pre	1.31	.36	1.39	.31	1.30	.21	1.25	.23	2.20	.81	1.93	.76	1.78	.53	2.00	.65
	Post	1.52	.33	1.79	.83	1.26	.25	1.71	.31	2.49	.57	2.39	.76	2.30	.51	2.14	.49

Table 5 Continued

		GRADE 7								GRADE 8							
		MALE STUDENTS				FEMALE STUDENTS				MALE STUDENTS				FEMALE STUDENTS			
		Experimental		Control		Experimental		Control		Experimental		Control		Experimental		Control	
Scale	Test	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Pill Benefits	Pre	1.42	.21	1.40	.11	1.51	.21	1.37	.17	1.68	.35	1.72	.35	1.64	.31	1.65	.26
	Post	1.46	.20	1.43	.26	1.56	.08	1.47	.11	1.76	.25	1.70	.51	1.77	.27	1.62	.27
Pill Costs	Post	1.66	.19	1.57	.28	1.69	.12	1.61	.17	1.96	.11	1.84	.28	1.86	.21	1.84	.28
Hard Peer Att	Pre	1.34	.09	1.47	.27	1.89	.40	1.48	.05	2.04	1.89	2.08	.33	2.14	.32	2.22	.36
	Post	1.88	.12	1.75	.16	2.16	.16	2.23	.13	2.27	.40	2.69	.49	2.56	.40	2.39	.33
Hard Peer Use	Post	9.76	7.81	5.24	1.68	8.33	2.60	9.07	3.98	15.14	8.26	17.74	4.43	17.27	5.29	14.90	1.64
Hard Att	Pre	1.33	.15	1.17	.17	1.31	.08	1.26	.19	1.54	.34	1.43	.34	1.48	.13	1.32	.14
	Post	1.38	.22	1.34	.21	1.45	.15	1.56	.34	1.85	.32	1.80	.44	1.61	.18	1.56	.22
Inh Involve	Pre	1.15	.10	1.09	.10	1.04	.06	1.20	.24	1.25	.30	1.41	.44	1.09	.10	1.07	.08
	Post	1.20	.20	1.08	.05	1.08	.05	1.17	.16	1.45	.29	1.42	.28	1.14	.12	1.10	.14
Barb Involve	Pre	1.17	.24	1.03	.02	1.04	.02	1.03	.04	1.17	.20	1.25	.21	1.12	.20	1.22	.29
	Post	1.15	.17	1.03	.07	1.00	.00	1.15	.16	1.28	.32	1.25	.17	1.29	.22	1.14	.20
Amp Involve	Pre	1.21	.29	1.04	.07	1.04	.06	1.02	.04	1.17	.18	1.26	.23	1.16	.22	1.39	.57
	Post	1.23	.15	1.03	.07	1.01	.02	1.15	.18	1.34	.27	1.49	.31	1.28	.23	1.23	.18
Coc Involve	Pre	1.06	.07	1.03	.05	1.05	.10	1.00	.00	1.22	.17	1.16	.12	1.10	.13	1.24	.33
	Post	1.15	.12	1.01	.02	1.02	.03	1.13	.09	1.39	.22	1.47	.29	1.26	.19	1.24	.18
PCP Involve	Pre	1.02	.04	1.00	.00	1.00	.00	1.01	.02	1.11	.13	1.14	.18	1.21	.36	1.18	.38
	Post	1.12	.12	1.00	.00	1.00	.00	1.02	.03	1.18	.30	1.26	.20	1.15	.15	1.11	.14
LSD Involve	Pre	1.04	.07	1.00	.00	1.00	.00	1.00	.00	1.13	.19	1.09	.18	1.04	.09	1.14	.26
	Post	1.17	.10	1.03	.05	1.00	.00	1.02	.03	1.20	.30	1.21	.17	1.11	.12	1.11	.17
Her Involve	Pre	1.01	.01	1.02	.04	1.13	.21	1.03	.03	1.20	.27	1.11	.20	1.08	.12	1.13	.30
	Post	1.16	.10	1.00	.00	1.01	.02	1.02	.03	1.22	.33	1.20	.16	1.08	.13	1.03	.04

The results from these analyses are summarized in Table 6. Effect sizes are listed below for statistically significant effects. For grade 7 males no treatment effects were obtained. For grade 7 females positive treatment effects were obtained on Knowledge (2.19 SD), Soft Peer Att (2.61 SD), Soft Peer Use (2.21 SD), Alc Involve (1.18 SD), and Pot Involve (1.73 SD). For grade 8 males a positive treatment effect was found on Knowledge (3.42 SD). For grade 8 females a positive treatment effect was obtained on Alc Costs (1.25 SD) and a negative treatment effect on Barb Involve (1.06 SD).

TABLE 6

SUMMARY OF COVARIANCE ANALYSES

	Grade 7 Males		Grade 7 Females	
Posttest Measure	B[a]	F (1,5)	B[a]	F (1,5)
General Att	.63	< 1	1.05	< 1
Alc Benefits	.63	< 1	.00	< 1
Pot Benefits	.72	< 1	.32	< 1
Alc Costs	.68	< 1	.17	< 1
Pot Costs	.89	< 1	.19	< 1
Soft Att	1.05	< 1	.37	3.11
Knowledge[b]	-	2.32	-	9.58**+
Soft Peer Att	.58	< 1	-.18	9.11**+
Soft Peer Use	12.21	< 1	-6.09	5.46* +
Alc Involve	.73	< 1	.89	9.01**+
Cig Involve	.42	1.06	.85	3.92
Pot Involve	1.57	< 1	.49	6.69**+
Pill Benefits	.95	< 1	.29	< 1
Pill Costs	.62	< 1	.16	< 1
Hard Peer Att[b]	-	1.82	-	< 1
Hard Peer Use[b]	-	1.28	-	< 1
Hard Att	.88	1.86	1.41	3.37
Inh Involve	-	-[c]	-	-[c]
Barb Involve	-	-[c]	-	-[c]
Amp Involve	-	-[c]	-	-[c]
Coc Involve[b]	-	-[c]	-	-[c]
PCP Involve[b]	-	-[c]	-	-[c]
LSD Involve[b]	-	-[c]	-	-[c]
Her Involve[b]	-	-[c]	-	-[c]

Table 6 continued
Summary of Covariance Analyses

	Grade 8 Males		Grade 8 Females	
Posttest Measure	B[a]	F (1,7)	B[a]	F (1,7)
General Att	.93	< 1	.65	< 1
Alc Benefits	.33	< 1	.45	< 1
Pot Benefits	.42	< 1	.71	< 1
Alc Costs	.18	1.84	.38	6.06**+
Pot Costs	.36	< 1	.48	< 1
Soft Att	.52	< 1	.20	< 1
Knowledge[b]	-	28.91***+	-	1.66
Soft Peer Att	.69	< 1	.13	3.49
Soft Peer Use	10.68	1.05	2.39	< 1
Alc Involve	.35	< 1	.08	1.64
Cig Involve	.37	< 1	.61	< 1
Pot Involve	.77	< 1	.13	< 1
Pill Benefits	.67	< 1	.70	1.46
Pill Costs	.23	< 1	.23	< 1
Hard Peer Att[b]	-	2.19	-	< 1
Hard Peer Use[b]	-	< 1	-	< 1
Hard Att	.98	< 1	-.47	1.65
Inh Involve	.50	< 1	-.85	< 1
Barb Involve	.69	< 1	.50	4.43*-
Amp Involve	1.02	< 1	.32	2.17
Coc Involve[b]	-	< 1	-	< 1
PCP Involve[b]	-	< 1	-	< 1
LSD Involve[b]	-	< 1	-	< 1
Her Involve[b]	-	< 1	-	< 1

[a]B refers to the unstandarized regression coefficient of posttest on its corresponding pretest.

[b]Analysis of variance was conducted on this variable. The error df are 6 for grade 7 analyses and 8 for grade 8 analyses.

[c]Due to small posttest variances no analysis was performed.

* = p <.10
** = p <.05
*** = p <.001
\+ = effect was in the desired direction.
\- = effect was in the undesired direction.

Discussion

The drug education course produced many of the predicted effects for grade 7 females, but not for grade 7 males or grade 8 males or females. For grade 7 females, the course produced a coherent pattern of effects on knowledge, perceived peer attitudes and use of "gateway" or "soft" drugs, and on personal involvement in use of alcohol and marijuana, two of the three gateway drugs. For the same subgroup, the course did not produce predicted effects on perceived costs and benefits of soft drug use or on attitudes toward the soft drugs.

Among the many plausible explanations for the failure of the course to show stronger effects on other students, the one which must be considered first is the likelihood of an "implementation failure," that is, an improperly implemented intervention (Patton, 1979). Classroom teachers who observed the course sessions reported that the course was not well tailored to the age group and that it was not effectively delivered. Students' feedback via anonymous questionnaires confirmed that many felt the course was of little use or interest. Experimental grade 8 males demonstrated more knowledge of course-specific information than did controls, indicating at least some progress toward one of the course objectives. But no data were collected from students which might show that other course objectives (i.e., better understanding of human motivation; more systematic decision

making[10]) were or were not achieved, and classroom teachers reported that many students failed to master these elemtents of the course curriculum.

All in all, it seems likely that the course as implemented was a less than adequate representation of the course as conceived. Thus, another evaluation will be conducted to assess the efficacy of a course which incorporates improvements suggested by the process evaluation.

Parenthetically, it is worth noting that previous studies of drug education programs have not included process evaluations of the scope reported here. If effective implementation of drug education programs is problematic, as our experience in this study indicates might be the case, the lack of positive results in previous studies may be, at least in part, attributable to other implementation failures. To be sure, drug education programs may be ineffective for other reasons, and even well executed programs may produce disappointing results. But an important element in ascertaining the potential effectiveness of drug education, and an element which may yet need to be convincingly documented, is the opportunity to evaluate soundly designed, effectively delivered courses or programs.

A question raised by this study is whether drug education courses should be delivered at a particular age level. The present course showed desirable effects for grade 7 females but only a few, mixed effects for

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[10]We made several unsuccessful attempts to construct a measure of students' skills at systematic decision making, after a futile search for an established measure. We also were unsuccessful at scaling a measure of inclinations to use a systematic decision-making process.

grade 8 females. Process evaluation indicated that compared to seventh graders, eighth graders were less inclined to judge course information as useful for making decisions about using drugs, and were also somewhat more critical of the course. Seventh graders may be more receptive to information, and more willing to alter their behavior as a result of the information they receive. Perhaps drug education efforts will have better chances of succeeding if they are delivered at seventh grade or below.

REFERENCES

Blum, R.H. *Drug Education: Results and Recommendations.* Lexington, Mass: Lexington Books. 1976.

Goodstadt, M.S. Myths and methodology in drug education: a critical review of the research evidence. In M.S. Goodstadt (Ed.), *Research on Methods and Programs of Drug Education.* Toronto: Alcoholism and Drug Addiction Research Foundation of Ontario, 1973, 113-145.

Goodstadt, M.S. Drug education--a turn on or a turn off? Paper presented at The 10th International Conference on Health Education, London, September, 1979.

Lasswell, H.D. and Rubenstein, R. *The Sharing of Power in a Psychiatric Hospital.* New Haven, Conn: Yale University Press, 1966.

Patton, M.Q. Evaluation of program implementation. In L. Sechrest, and Associates (Eds.), *Evaluation Studies Review Annual, Volume 4.* Beverly Hills: Sage Publications, 1979, 318-346.

Schaps, E., Di Bartolo, R., Moskowitz, J., Palley, C., and Churgin, S. A review of 127 drug abuse prevention program evaluations. *Journal of Drug Issues,* 1981, *11,* 17-44.

Stuart, R.B. Teaching facts about drugs: pushing or preventing. *Journal of Educational Psychology,* 1974, *6,* 189-201.

Weisberg, H.I. Statistical adjustments and uncontrolled studies. *Psychological Bulletin,* 1979, *86,* 1149-1164.

Wepner, S.F. Which way drug education? *Journal of Drug Education,* 1979, *9,* 93-103.